

CLAIMS

What is claimed is:

- 5 1. A circuit breaker movable between an OFF condition and an ON condition, the circuit breaker comprising:
- a housing;
- a set of separable contacts disposed on the housing;
- an operating mechanism that is disposed on the housing and is operable to
- 10 move the contacts between a disconnected position and a connected position when activated, the operating mechanism including a movable structure that is movably disposed on the housing and is movable between a first position corresponding with the OFF condition of the circuit breaker and a second position corresponding with the ON condition of the circuit breaker;
- 15 a trip unit that is responsive to current through the separable contacts for activating the operating mechanism;
- a switch for providing an input to the trip unit, the switch being switchable between a first condition corresponding with the OFF condition and a second condition that corresponds with the ON condition;
- 20 a delay mechanism for delaying movement of the switch from the first condition to the second condition for a given period of time after a circuit breaker has moved from the OFF condition to the ON condition;
- the delay mechanism including an inertia member, a first spring, and a second spring;
- 25 the inertia member being movable between an initial position corresponding with the OFF condition of the circuit breaker and a terminal position corresponding with the ON condition of the circuit breaker, the inertia member in the initial position maintaining the switch in the first condition, the inertia member in the terminal position permitting movement of the switch to the second condition;
- 30 the first spring extending between the inertia member and the housing and biasing the inertia member toward the terminal position;

the second spring extending between the movable structure and the inertia member when the movable structure is in the first position, the second spring biasing the inertia member toward the initial position and overcoming the bias of the first spring to retain the inertia member in the initial position when the movable structure
5 is in the first position;

the bias of the first and second springs being equal and retaining the inertia member in a state of equipoise at the initial position when the movable structure is in an intermediate position between the first and second positions; and

the bias of the first spring overcoming any bias of the second spring and
10 biasing the inertia member toward the terminal position when the movable structure is in substantially any of the second position and a location disposed between the intermediate and second positions.

2. The circuit breaker of Claim 1 wherein
15 the second spring extends between the movable structure and the inertia member and overcomes the bias of the first spring to retain the inertia member in the initial position when the movable structure is in any of the first position and a location disposed between the intermediate and first positions.

20 3. The circuit breaker of Claim 1 wherein
the inertia member is pivotably movable about a pivot between the initial and terminal positions.

4. The circuit breaker of Claim 3 wherein
25 the movable member is a crank affixed to a shaft that pivots the crank about a shaft axis between the first and second positions.

5. The circuit breaker of Claim 4 wherein
the second spring is a torsion spring having a body, a first leg, and a second
30 leg, the body extending about the pivot, the first leg being engageable with the crank, the second leg being engageable with the inertia member.

6. The circuit breaker of Claim 5 wherein
the pivot provides a pivot axis for the inertia member, the pivot axis being
parallel with and spaced from the shaft axis.
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7. The circuit breaker of Claim 6 wherein
the crank includes a slot formed therein, the first leg being slidably disposed in
the slot.
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8. The circuit breaker of Claim 5 wherein
the body of the second spring pivots about the pivot between a first orientation
and a second orientation when the circuit breaker moves between the OFF and ON
conditions.
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9. The circuit breaker of Claim 4 wherein
the inertia member includes a foot that is engaged with the shaft when the
inertia member is in the terminal position.
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10. The circuit breaker of Claim 1 wherein
the inertia member includes a lateral surface that is slidably engageable with
the switch to retain the switch in the first condition when the inertia member is in the
initial position.
- 25
11. The circuit breaker of Claim 10 wherein
the lateral surface is disengaged from the switch to permit the switch to move
to the second condition when the inertia member is in the terminal position.
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12. The circuit breaker of Claim 10 wherein
the inertia member is pivotably movable about a pivot between the initial and
terminal positions; and
the lateral surface being of a substantially fixed radius from the pivot.

13. The circuit breaker of Claim 1 wherein
the biasing forces of the first and second springs are substantially at a
maximum when the circuit breaker is in the OFF condition.